

WHAT IS CLAIMED IS:

1. A heat insulating and sound insulating duct wall structure which composes a gas flow channel, the same duct wall structure comprising:

5 an inner plate at a gas flow side;  
an outer plate at the atmospheric side;  
one or more intermediate members with its lengthwise direction disposed in parallel to the inner plate and outer plate in an intermediate portion between the inner plate and  
10 the outer plate;

a plurality of first supporting members both ends of which are, respectively, fixed at the inner plate and intermediate member in order to retain the spacing between the inner plate and the intermediate member;

15 a plurality of second supporting members both ends of which are, respectively, fixed at the outer plate and intermediate member in order to retain the spacing between the outer plate and the intermediate member;

a vibration deadening washer attached to the connection  
20 portion at the intermediate member side of the second supporting members; and

a heat insulating member filled in the clearance between the intermediate member, the first and second supporting members and the vibration deadening washer between the inner plate and  
25 the outer plate.

2. The heat insulating and sound insulating duct wall structure according to Claim 1, wherein the fixing position of the first supporting members and the intermediate member and fixing position of the second supporting members and the  
30 intermediate member are shifted from each other in a gas flowing

direction.

3. The heat insulating and sound insulating duct wall structure according to Claim 1, wherein the attaching position of the vibration deadening washer is provided in an area in  
5 a duct wall whose temperature is 400°C or less.

4. The heat insulating and sound insulating duct wall structure according to Claim 1, wherein the vibration deadening washer is provided at half the entire thickness of the heat insulating member filled between the inner plate and the outer  
10 plate or at the outer plate side position from the half thereof.

5. The heat insulating and sound insulating duct wall structure according to Claim 4, wherein a heat insulating member filled between the intermediate member and the outer plate is composed of a vibration deadening material or a vibration  
15 dampening material having a thickness which is greater by at least three times than the thickness of the outer plate, and is adhered to the outer plate in a state where the heat insulating member is compressed at a compression ratio of at least 10% of the entire thickness thereof.

20 6. The heat insulating and sound insulating duct wall structure according to Claim 1, wherein a plurality of holes through which the second supporting members are passed are provided in the intermediate member in the lengthwise direction of the intermediate member.

25 7. The heat insulating and sound insulating duct wall structure according to Claim 6, wherein a plurality of holes through which the second supporting member secured at the intermediate member are passed are composed with a hole for fixing the vibration deadening washer disposed at the middle  
30 part in the lengthwise direction of the intermediate member

and a one or more sets of loose holes disposed at the symmetrical positions of the intermediate member in the lengthwise direction thereof centering around the corresponding fixing hole .

8. The heat insulating and sound insulating duct wall structure according to Claims 1, wherein a plurality of intermediate members are, respectively, disposed in both the gas flowing direction and the direction orthogonal thereto with the lengthwise direction thereof orthogonal to the gas flowing direction.

9. The heat insulating and sound insulating duct wall structure according to Claim 1, wherein a plurality of intermediate members are, respectively, disposed in both the gas flowing direction and the direction parallel thereto with the lengthwise direction thereof parallel to the gas flowing direction.

10. The heat insulating and sound insulating duct wall structure according to Claim 1, wherein the inner plate is composed of a plurality of inner plate members laminated to each other, and the respective inner plate members are provided with a plurality of holes through which the first supporting member is passed.

11. The heat insulating and sound insulating duct wall structure according to Claim 10, wherein a plurality of holes through which the first supporting member secured in the respective inner plate members are provided with a hole for fixing the vibration deadening washer disposed at the middle part of the inner plate member and one or more sets of loose holes disposed at symmetrical positions of the inner plate members centering around the corresponding fixing hole.

12. The heat insulating and sound insulating duct wall

structure according to Claim 10, wherein the respective inner plate members are disposed so as to partially overlap with the inner plate member adjacent thereto, the inner plate member at the upstream side of a gas flow is installed on the inner plate member at the downstream side thereof, and the inner plate member at the upper side in the perpendicular direction is installed on the inner plate member at the lower side in the perpendicular direction.

13. The heat insulating and sound insulating duct wall structure according to Claim 1, wherein a middle plate for bifurcating the heat insulating member is provided at the attaching position of the intermediate member along the lengthwise direction of the inner plate and outer plate.

14. The heat insulating and sound insulating duct wall structure according to Claim 1, wherein the vibration deadening washer is composed of such a structure as a vibration deadening member placed and nipped between two plate-shaped members.

15. A heat insulating and sound insulating duct wall structure which composes a gas flow channel, and the same duct wall structure comprising:

an inner plate at a gas flow side;

an outer plate at the atmospheric side;

a plurality of supporting members, both ends of which are fixed at the inner plate and outer plate, for retaining the interval between the inner plate and the outer plate;

a heat insulating member filled in the clearance among the supporting members located between the inner plate and the outer plate; and

a vibration deadening washer composed of a tray-shaped pan worked to be tray-shaped, which is attached to a connection

portion between the supporting members and inner plate, which are in contact with a gas flow, a vibration deadener inserted into the tray-shaped pan, and an upper cover disk matched with the inner diameter of the tray-shaped pan.

5           16.    A component of a duct wall, which composes an inner plate at a gas flow side; an outer plate at the atmospheric side; a plurality of supporting members, both ends of which are fixed at the inner plate and outer plate, for retaining the interval between the inner plate and the outer plate; a  
10   heat insulating member filled in the clearance among the supporting members located between the inner plate and the outer plate, the same component being a vibration deadening washer composed of:

          a tray-shaped pan worked to be tray-shaped, which is  
15   attached to a connection portion at the inner plate side of the supporting members which are in contact with a gas flow; a vibration deadener inserted into the tray-shaped pan; and an upper cover disk matched with the inner diameter of the tray-shaped pan.

20           17.    An external heat insulating structure comprising:  
          a heat insulating member disposed at a further outer air side of the outer plate of a duct wall structure described in the first aspect of the invention;

          an outer casing (lagging) supported by the supporting  
25   members attached to the outer plate and disposed in a direction parallel to the lengthwise direction of the outer plate with spacing opening from the outer plate; and

          a vibration deadening washer, described in the sixteenth aspect, which is fixed between the outer casing and the  
30   supporting members.